

Remarks

Rejections Under 35 USC 112:

Claim 18 was rejected under 35 USC 112, second paragraph because the limitation “the first nodes” on line 11. Claim 18 has been corrected with this response.

Rejections Under 35 USC 102:

Claims 6-8, 11, 17, and 18 were rejected under 35 USC 102(e) as being anticipated by Larsson (6704293). In response, claims 7, 8, and 17 have been cancelled, and independent claims 6, 17, and 18 have been amended to better recite what the Applicants’ regard as their invention.

As stated in the Applicants’ specification, although message flooding is a dependable way to find a route within the network, flooding is proven to generate excessive amounts of system traffic and interference. To address this issue, the present invention provides for an overlay communication system that aides in determining a route between nodes in an underlay communication system. In particular, when a first node wishes to discover a route to a second node, the first node notifies an overlay communication system, which notifies all nodes in the underlay communication system of the desire. Both the first and the second nodes begin flooding the underlay system simultaneously. When a node in the underlay system hears both the flood messages from the first and the second node, the overlay communication system is notified and stops all flooding. The route information is then provided to the first and the second nodes via the overlay communication system.

Because flooding takes place simultaneously from two nodes within the underlay communication system, the search will reduce the amount of signaling in half for a uniform distribution of the ad hoc nodes. This will equate into a less interference in the ad hoc network and less battery drain. A second advantage of the disclosure is the reduction of discovery time. If the search is unidirectional the expected time to discover the route is the time that a flood message reaches the target plus the time that the acknowledgement reaches the source. In the preferred embodiment of the present invention this time is cut in half since the message and the acknowledgement have to parse half of nodes than in the actual algorithms.

With the above in mind, independent claim 6 and 17 have been amended to include the fact that the first and the second nodes are part of an underlay communication system, and that route information is transmitted through an overlay communication system to the first node. Analysis of Larsen reveals that this reference teaches a method to piggyback broadcast messages together to reduce the overhead and the broadcast traffic. Larsen fails to teach or otherwise suggest that an overlay communication system can be used by nodes in an underlay communication system to transmit route information. In fact, the term overlay or underlay aren't even mentioned by Larssen. Because of this, claim 6 and 17 are in proper condition for allowance.

Regarding claim 18, this claim has been amended to include the limitations that the first, second, and third nodes are part of an underlay communication system and that the base station is part of an overlay communication system. This claim also states that route information is received from the third node by the base station and then provided to the first node. As mentioned above, Larsson fails to teach or otherwise suggest an overlay communication can be used by nodes in an underlay communication system during route discovery.

Claim Rejections Under 35 USC 103(a):

Claims 1-5, 9, 12-13, 15, and 16 were rejected under 35 USC 103(a) as being unpatentable over Larsson in view of Haas (6304556). In response, these claims were amended to include the limitations that an overlay communication system aids an underlay communication system in route discovery. In particular, claims 1 and 15 specifically state that the first and the second nodes are part of an underlay ad-hoc communication system, and that route information is received from an overlay communication system. As stated above, Larsson fails to teach or otherwise suggest that an overlay communication system can aid an underlay communication system with route discovery. Additionally, Haas fails to teach or otherwise suggest this limitation as well. Because of this, claims 1 and 15 are allowable over the prior art of record.

Regarding independent claims 4 and 16, these claims specifically have the limitation that a node in an underlay communication system receives a message from an overlay communication system to begin broadcasting route discovery messages within the underlay communication system. As discussed above, Larsson teaches a method to piggyback broadcast messages together to reduce the overhead and the broadcast traffic.

The Examiner states that Haas teaches a cellular communication system, however, the only discussion about cellular systems is the fact that ad hoc networks are different than cellular networks since there are no centralized entities in an ad hoc network (col. 2). Therefore, there is no disclosure from Larson or Haas of receiving from an overlay communication system instruction to broadcast a route discovery message.

In Summary:

In summary, all of the Applicants' amended claims now have the limitations that an overlay communication system aids an underlay communication system in some form. The prior art fails to teach or otherwise suggest the limitations now contained in the Applicants' amended claims. Therefore, all claims are in proper condition for allowance.

No amendment made was related to the statutory requirements of patentability unless expressly stated herein; and no amendment made was for the purpose of narrowing the scope of any claim, unless Applicant has argued herein that such amendment was made to distinguish over a particular reference or combination of references. As the Applicant has overcome all substantive rejections given by the Examiner the Applicant contends that this Amendment, with the above discussion, overcomes the Examiner's rejections to the pending claims. Therefore, the Applicant respectfully requests allowance of the application. If the Examiner is of the opinion that any issues regarding the status of the claims remain after this response, the Examiner is invited to contact the undersigned representative to expedite resolution of the matter. Finally, please charge any fees (including extension of time fees) or credit overpayment to Deposit Account No. 502117.

Respectfully Submitted,
Calcev, ET AL.

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